



The Bulletin 383

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November 2014

Thursday 20 November 2014

Future Events

Thursday 20 November 2014

The Liversidge Research Lecture

Recent Studies on the Total Synthesis of Natural Products and Related Systems

Delivered by:

Professor Martin Banwell, ANU

Lecture Theatre 4, School of Chemistry,
Eastern Avenue, University of Sydney

5:30 for 6:15 pm

Wednesday 3 December 2014

1228th Ordinary General Meeting

2014 Jak Kelly Award Presentation

followed by the Society's

Christmas Party

Union, University & Schools Club

25 Bent St, Sydney

6:00 for 6:30 pm

Enjoy a welcome drink from 6 pm

Book for the function after the meeting:

\$35 per head

Dress code: jacket and tie

Tuesday 9 December 2014

Dirac Lecture

The Beauty and Serendipity of Blue Sky Research

Delivered by:

Professor Serge Haroche, Head of the Collège de France, Paris

Tyree Room, John Niland Scientia
Building, University of NSW

5:45 for 6:00 pm

Wednesday 4 February 2015

1229th. Ordinary General Meeting and Scholarship Presentations

Union, University & Schools Club
25 Bent St, Sydney

6:00 for 6:30 pm

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The Liversidge Research Lecture for 2014

Recent Studies on the Total Synthesis of Natural Products and Related Systems

Professor Martin Banwell

*Research School of Chemistry, Institute of Advanced Studies,
Australian National University, Canberra*

**Lecture Theatre 4, School of Chemistry,
Eastern Avenue, University of Sydney**

5:30 pm for 6:15 pm start

Refreshments served outside the theatre from 5:30 pm

A diverse range of biologically active natural products is being targeted for synthesis in our laboratories. Of course, such pursuits can become all the more fascinating when completely unexpected processes are uncovered. In this presentation, examples of these possibilities will be presented.

Professor Banwell, BSc PhD (Wellington),

FRACI, FRSC, Hon FRSNZ, FAA was appointed Professor of Chemistry at the Australian National University in 1999. His research interests are in the area of synthetic organic chemistry, particularly the development



of new methodologies and their application to the total synthesis of biologically active natural products. He is the author or co-author of some three hundred journal articles in this broad area.

Wednesday 3 December 2014

The Jak Kelly Award and the Society's Christmas Party

Incorporating the 1228th Ordinary General Meeting

Union, University & Schools Club

25 Bent St. Sydney

6:00 for 6:30 pm

The winner of the 2014 Jak Kelly Award for a young physicist will be determined in conjunction with the Australian Institute of Physics at its Postgraduate Awards Day on Tuesday 18 November at the University of Sydney. As part of the Award, he or she will be invited to present their work to the Society as part of our 1228th Ordinary General Meeting. We anticipate that the Award will be presented to the winner by Professor Kelly's widow, Mrs Irene Kelly.

The meeting will be followed immediately by the Society's Christmas Party to which all Members, Fellows and their friends and colleagues are warmly invited. A range of hot and cold canapés will be served, together with a range of beverages. The cost is \$35 per head. Bookings can be made using the Christmas Party flyer or directly from the Society's website.

(Continued from page 1)

Wednesday 25 February 2015

Meeting of the Four Societies

Latest Developments in Small Modular Reactors

Delivered by:

Dr. Adi Paterson, CEO, ANSTO

Venue: TBA

5:30 for 6:00 pm

SOUTHERN HIGHLANDS BRANCH

Thursday 20 November 2014

Genes and their relationship with Epigenes

Delivered by:

Associate Professor Dr. Catherine Suter,

Victor Chang Cardiac Research Institute

Time: 6:30 pm

From the President



Science at Sydney University and a towering intellectual figure of the late 19th and early 20th centuries. The lecture in his honour has been delivered in conjunction with University of Sydney every two years since 1931. It is also sponsored by the Royal Australian Chemical Institute. It will take place in Lecture Theatre 4, School of Chemistry, Eastern Avenue, University of Sydney on Thursday 20 November (5:30 pm for 6:15 pm start, with refreshments being served outside the theatre from 5:30 pm.)

Another very important occasion is the 2014 Dirac Lecture presented by the University of NSW in conjunction with the Society and Australian Institute of physics. This year we are very fortunate that the lecture will be delivered by Professor Serge Haroche of the Collège de France. Professor Haroche (jointly with David J. Wineland) was awarded the 2012 Nobel Prize for Physics for "ground-breaking experimental methods that enable measuring and manipulation of individual quantum systems", for their work on understanding the photon. The Dirac lecture will

be presented on Tuesday 9 December from 5:45 pm to 7:30 pm in the Tyree Room, John Niland Scientia Building. His talk is entitled "The beauty and serendipity of blue sky research".

The 2014 Jak Kelly award seminar will be held in November with a presentation by the winner to take place at our meeting prior to the Christmas party on Wednesday 3 December.

Planning continues on the events programme for 2015 – if there are specific subject areas you would like to see included, please contact John Hardie, chairman of the Events Committee. As I mentioned last month, have a number of brand-new concepts under development that we hope will be particularly attractive across our entire membership of Fellows and Members.

If there are any issues you would like to raise with me, I am easily contacted by e-mail at president@royalsoc.org.au and would like to hear from you.

Donald Hector

There are three events between now and the end of the year. The first is the Liversidge Research Lecture 2014. This will be delivered by Professor Martin Banwell of the Australian National University. Professor Banwell is one of Australia's most accomplished chemists. His research focuses on organic synthesis, in particular, the total synthesis of biologically-active natural compounds and their analogues. The Liversidge Research Lecture has a great tradition – Liversidge was the first Dean of

Southern Highlands Branch

Report of 6 November 2014 Meeting

Bees in the food chain: Is life as we know it about to end?

Dr Madeleine Beekman

Professor of Behavioural Ecology and ARC Future Fellow, School of Biological Sciences, University of Sydney

Dr Beekman opened her lecture to an audience of 80 with a recent report from Avaaz, the campaigning community bringing people-powered politics to decision making worldwide. As of three weeks ago, Avaaz declared that 3,500,000 people had signed a petition to governments worldwide to ban toxic pesticides such as neonicotinoids. They stated that the EU had already banned them, and they were expecting the US government to soon do the same.

Among other things, they argued that our entire food chain is in danger as bees die off. They stated that bees pollinate 75% of growing plants, that multiple scientists blame certain toxic pesticides for bees' rapid demise, and that rapid action was required before the honey bees became extinct. Dr Beekman addressed each of these arguments in turn.

She started with the claim that bees pollinate 75% of growing plants. In fact, globally 60% of our food comes from crops that do not depend on animal pollinators. Those depending on pollinators account for 35%, while 5% of crops are unclear. Of the 35% depending on pollinators, only 12% found the pollinators essential, 28% were highly dependent and 20% slightly dependent.

Dr Beekman described honeybees as the most economically valuable pollinators of crop monocultures globally, with the yields of some fruit, seed and nut crops decreasing by more than 90% in the absence of bees. In the absence of wild bees, managed bees need to be provided. Compared with non-honeybees, honeybees are versatile, cheap and convenient, although they are not necessarily the best pollinator for all crops on a per flower basis.

Dr Beekman then turned her attention to the claims concerning the neonicotinoids, a class of neuro-active insecticides chemically similar to nicotine. These are systemic pesticides widely used as seed coatings, which have allowed reduction in the total amount of pesticides used. They also show reduced toxicity compared with previously used organophosphate and carbamate insecticides.

Although neonicotinoids were banned from use in flowering crops (e.g. rapeseed) in the EU for two years due to heavy campaigns, Dr Beekman stated that no effects on bees had been observed in field studies using field-realistic dosages. In laboratory studies however, lethal and sub-lethal effects on bees have been observed. The neonicotinoid ban hit UK farmers hard as their crops fell victim to the ravages of pests which had previously been well controlled. She referred attendees interested in an objective summary of what is currently known about the effects of neonicotinoids (and the possible consequences of a ban) to *Godfray et al. 2014 Proc R Soc B 281:20140558*

Finally, Dr Beekman addressed the Avaaz argument that the honeybees are going extinct and that there will be a pollinator crisis. She stated that the number of managed colonies in the US is now half what it was in the 1950s, but has been stable since 2000. However, global colony numbers have increased over the same period. In those places

**One of every three bites
of food you eat**



depends on the honey bee.

[facebook.com/organicconsumers](https://www.facebook.com/organicconsumers)

www.organicconsumer.org

where the bee colony numbers have decreased, causes may include the spread of pests and parasites, such as the *Varroa* mite, changes in land use, improper pesticide and herbicide use, ageing of the beekeeper population in Europe and the US, and lower market prices for their products and services.

She concluded that honeybees are not going extinct any time soon, although many other bee species have gone extinct or are threatened with extinction. She advised that as Australia relies heavily on honeybees for pollination, and the arrival of *Varroa* seems inevitable, we had better prepare for its arrival.

Clearly there is much more research needed in this complex field.

Anne Wood

Report of the Society's 1227th Ordinary General Meeting

held on 5 November 2014

A drop of Optics

Dr Steve Lee and Dr Tri Phan

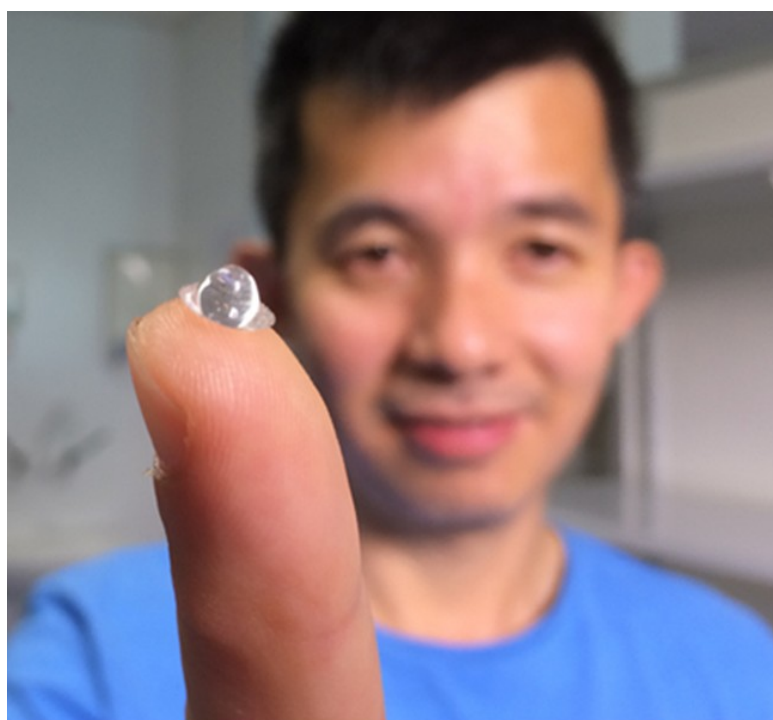
joint winners of the 2014 ANSTO Eureka Prize for Innovative Use of Technology

The talk at the 1227th AGM was presented by Dr Steve Lee and Dr Tri Phan, joint winners of the 2014 ANSTO Eureka Prize for Innovative Use of Technology. They received the award for developing a very inexpensive polymer lens with extraordinarily high resolution that can be used on cameras like those found on mobile telephones.

In recent years, miniaturisation has revolutionised sensors: small image sensors means that the optical device can also be miniaturised and it is much easier to get good optical qualities in a small lens than a large one. The early miniaturised lenses were ground from small pieces of glass and were quite expensive to manufacture. However, with the development of polymers with good optical qualities, high-quality lenses can now be moulded rather than

being ground. But if surface tension is allowed to create the lens surface rather than moulding, surface roughness (which is almost impossible to avoid with any moulding process) can be largely eliminated.

A familiar example is the optical quality of raindrops but if the liquid used to form the lens is of much greater viscosity than water, for example, viscoelastic polymers, gravity can be used to shape the surface of the lens to give specific optical properties. The



technique that Dr Lee and Dr Phan developed was to use highly viscous polydimethylsiloxane in as the polymer (this is also referred to a silicone polymer) and to suspend droplets from a small orifice so that gravity forms droplets with curvature that has the right optical characteristics. The silicone polymer

can be cross-linked and thus stabilise it shape simply by putting it into an oven to cure. Different lens geometries can be obtained by applying several layers of polymer with intermediate curing steps.

One application that Dr Lee and Dr Phan have developed is to use these lenses to clip onto the cameras on mobile telephones. Standard lens on mobile telephone (these are moulded) has a roughness of 200 nm whereas the elastomer lens is around 10 nm. Consequently, much finer detail can be resolved using the polymer lens. The opportunity is to integrate lenses such as these into smart phones and use these for diagnostic and remote sensing applications.

The technology was just released at the Google "The Mobile First World" conference in Taiwan.

Dirac Lecture and Medal Presentation 2014

The Beauty and Serendipity of Blue Sky Research

Professor Serge Haroche

Head of the Collège de France, Paris

Tuesday 9 December 2014 at 5:45 for 6:00 pm

Tyree Room, John Niland Scientia Building, University of NSW, Kensington



our uncertain global world and explain why it is essential to protect it and to make it thrive, in spite of the present economic difficulties.

Professor Haroche is a French physicist who was awarded the 2012 Nobel Prize for Physics jointly with David Wineland for "ground-breaking experimental methods that enable measuring and manipulation of individual quantum systems", a study

Nobel Laureate Professor Serge Haroche will illustrate the long road from fundamental discoveries to technological innovations by a few examples taken from his own field of research – atomic and optical physics. He will also reflect on the dangers that blue sky research faces in

of the particle of light, the photon. Since 2001 he has been a Professor at the Collège de France and holds the Chair of Quantum Physics. He is a member of the Société Française de Physique, the European Physical Society and a fellow and member of the American Physical Society.

The Dirac Lecture is held by the University of NSW in conjunction with the Royal Society of NSW and the Australian Institute of Physics, NSW Branch.

Registration essential:

RSVP@science.unsw.edu.au

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